Front

#8 $\underline{24} \cdot \underline{23} \cdot \underline{22} = 12{,}144$

#9 $\underline{24} \cdot \underline{23} \cdot \underline{22} \cdot \underline{21} = 255{,}024$

Back 756 ABC

#6 765ABC

$$\underset{\#}{\underline{10}} \cdot \underset{\#}{\underline{10}} \cdot \underset{\#}{\underline{10}} \cdot \underset{L}{\underline{26}} \cdot \underset{L}{\underline{25}} \cdot \underset{L}{\underline{24}}$$

$= 15,600,000$

$$\underline{10} \cdot \underline{9} \cdot \underline{8} \cdot \underline{26} \cdot \underline{25} \cdot \underline{24}$$

$= 11,232,000$

Difference

4,368,000

#5 A, N, G, L, E

$\underline{5} \cdot \underline{4} \cdot \underline{3} = 60$

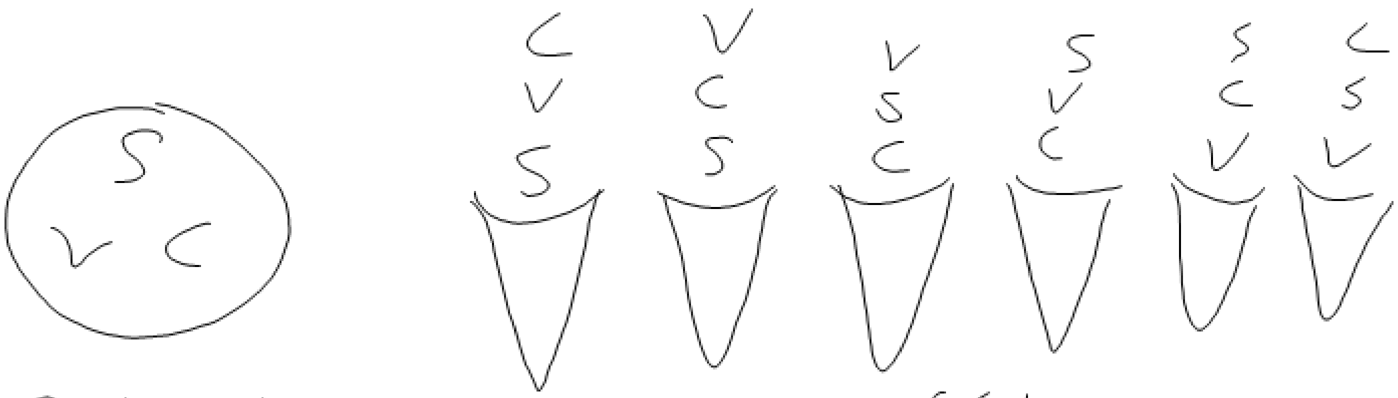
#4 GARDEN

$\underline{6} \cdot \underline{5} \cdot \underline{4} \cdot \underline{3}$

$= 360$

When do you divide?

Answer: when order doesn't matter, when you don't want repeats



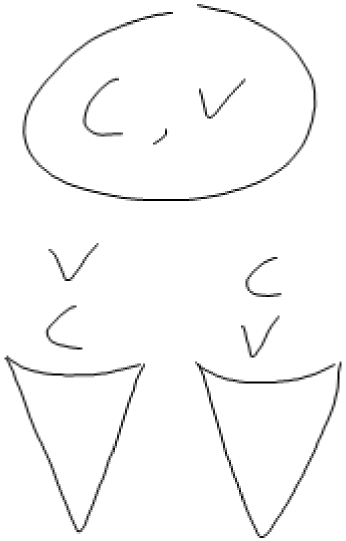
order doesn't matter
divide

order matters
don't divide

Bowls - order doesn't matter

Cones - order does matter

#11

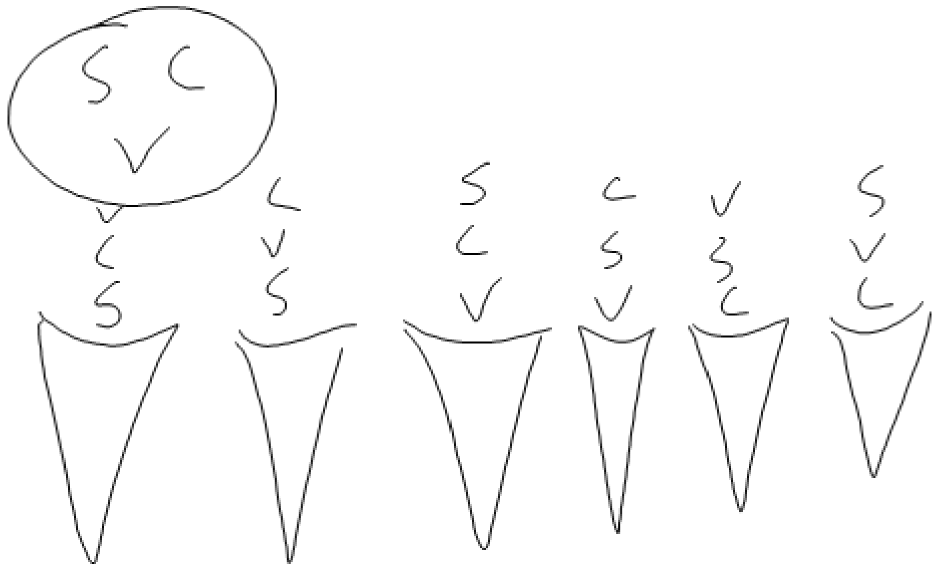


$465 \cdot 2 = 930$

$2!$

$2 \cdot 1$

#12



$220 \cdot 6 = 1320$

$3!$

$3 \cdot 2 \cdot 1$

17

Bowls → Cones, multiply by factorial of # scoops

order doesn't matter

order does matter

18

Cones → Bowls, divide by factorial of scoops

Bowl – order does not matter → Combination

$$_{24}C_3 \rightarrow \frac{24!}{3!\,(24-3)!} = \frac{24 \cdot 23 \cdot 22 \cdot \cancel{21} \cdot \cancel{20} \cdot \cancel{19} \cdot \cancel{18} \cdots}{3 \cdot 2 \cdot 1 \quad \cancel{21} \cdot \cancel{20} \cdot \cancel{19} \cdot \cancel{18} \cdots}$$

flavors (24) scoops (3)

$$\boxed{{}_nC_r = \frac{n!}{r!\,(n-r)!}}$$

Cone – order matters → Permutation

$$_{24}P_3 \rightarrow \frac{24!}{(24-3)!} = \frac{24 \cdot 23 \cdot 22 \cdot \cancel{21} \cdot \cancel{20} \cdot \cancel{19} \cdots}{\cancel{21} \cdot \cancel{20} \cdot \cancel{19} \cdots}$$

flavors (24) scoops (3)

$$\boxed{{}_nP_r = \frac{n!}{(n-r)!}}$$

#1 $\;{}^{9}C_{2} \rightarrow \dfrac{9!}{2!\,(9-2)!} = \dfrac{9!}{2!\,7!}$

$${}^{9}C_{7} \rightarrow \frac{9!}{7!\,(9-7)!} = \frac{9!}{7!\,2!}$$

$${}^{9}C_{5} = {}^{9}C_{4}$$

$${}^{7}C_{3} = {}^{7}C_{4}$$

HW

Finish the yellow sheet